

Accident Pattern	Probable Cause	Safety Enhancement
Run-off-roadway	Slippery Pavement	Improve skid resistance; provide adequate drainage; groove existing pavement
	Roadway Design Inadequate for Traffic Conditions	Widen lanes/shoulders; relocate islands; provide proper super-elevation; install/improve traffic barriers; improve alignment/grade; flatten slopes/ditches; provide escape ramp
	Poor Delineation	Improve/install pavement markings; install roadside delineators; install advance warning lights
	Poor Visibility	Improve roadway lighting; increase sign size
	Inadequate Shoulder	Upgrade roadway shoulders
	Improper Channelization	Improve channelization
Overturn	Roadside Features	Flatten slopes and ditches; relocate drainage facilities; extend culverts; provide traversable culvert end treatments; install/improve traffic barriers
	Inadequate shoulder	Widen lane/shoulder; upgrade shoulder surface; remove curbing obstructions; revise cross slope
	Pavement Feature	Eliminate edge dropoff; improve superelevation/crown

ACCIDENT ANALYSIS

Figure 55-8E

Accident Pattern	Probable Cause	Safety Enhancement
Bridges	Alignment	Realign bridge/roadway; install advance warning signs; improve delineation/markings
	Narrow Roadway	Widen structure; improve delineation/markings; install signing/signals
	Visibility	Remove obstruction; install advance warning signs; improve delineation and markings
	Vertical Clearance	Rebuild structure/adjust roadway grade; install advance warning signs; improve delineation and markings; provide height restrictor/warning device
	Slippery Surface (Wet/Icy)	Resurface deck; improve skid resistance; provide adequate drainage; provide special signing
	Rough Surface	Resurface deck; rehabilitate joints; regrade approaches
	Inadequate Barrier	Upgrade bridge rail system; upgrade approach rail/terminals; upgrade bridge - approach rail connections; remove hazardous curb; improve delineation and marking
Parked Vehicles	Inadequate Road Design	Widen lanes/shoulders

ACCIDENT ANALYSIS

Figure 55-8E (Continued)

Accident Pattern	Probable Cause	Safety Enhancement
Fixed Object	Obstructions In or Too Close to Roadway	Remove/relocate obstacles; install breakaway features to light poles, signposts, etc.; protect objects with guardrail; install crash cushions; delineation/reflectorize safety hardware
	Inadequate Lighting	Improve roadway lighting
	Inadequate Pavement	Install reflectorized pavement marking lines/raised markers
	Inadequate Signs, Delineators and Guardrail	Install reflectorized paint and/or reflectors on the obstruction; add special signing; upgrade barrier system
	Inadequate Road Design	Improve alignment/grade; provide proper superelevation; install warning signs/delineators; provide wider lanes
	Slippery Surface	Improve skid resistance; provide adequate drainage; groove existing pavement
Sideswipe or Head-On	Inadequate Road Design	Provide wider lanes; improve alignment/grade; provide passing lanes; provide roadside delineators; sign and mark unsafe passing areas
	Inadequate Shoulder	Improve shoulders
	Excessive Vehicle Speed	Install median devices
	Inadequate Pavement Markings	Install/improve centerlines, lane lines and edgelines; install reflectorized markers
	Inadequate Channelization	Install acceleration and deceleration lanes; improve/install channelization; provide turning bays
	Inadequate signing	Provide advance direction and warning signs; add illuminated name signs

ACCIDENT ANALYSIS

Figure 55-8E (Continued)

Accident Pattern	Probable Cause	Safety Enhancement
Intersection (Signalized/ Unsignalized) Left-Turn, Head-On, Right Angle, Rear End	Large Volume of Left/ Right Turns	Widen road; channelize intersection; install stop signs; provide signal; increase curb radii
	Restricted Sight Distance	Remove sight obstructions; provide adequate channelization; provide left/ right turn lanes; install warning signs; install stop signs; install signal; install advance markings to supplement signs; install stop bars
	Slippery Surface	Improve skid resistance; provide adequate drainage; groove pavement
	Large Numbers of Turning Vehicles	Create left- or right-turn lanes; curb radii; install signal
	Inadequate Lighting	Improve roadway lighting
	Lack of Adequate Gaps	Provide signal; provide stop signs
	Crossing Pedestrians	Install/improve signing or marking of pedestrian crosswalks; install signal
	Large Total Intersection Volume	Install signal; add traffic lane
	Excessive Speed on Approaches	Install rumble strips; improve warning devices
	Inadequate Advance Warning Signs	Install advance warning signs
	Inadequate Traffic Control Devices	Upgrade traffic control devices
	Poor Visibility of Signals	Install/improve advance warning devices; install overhead signals; install 305-mm signal lenses; install visors/back plates; relocate signals; remove sight obstructions; add illuminated/reflectorized name signs
	Unwarranted Signals	Remove signals
	Inadequate Signal Timing	Upgrade signal system timing/phasing

ACCIDENT ANALYSIS

Figure 55-8E (Continued)

Accident Pattern	Probable Cause	Safety Enhancement
Access Related	Left-Turning Vehicles	Install median devices; install two-way left-turn lanes
	Improperly Located Driveway	Move driveway to side street; install curbing to define driveway location; consolidate adjacent driveways
	Right-Turning Vehicles	Provide right-turn lanes; increase the width of driveways; widen through lanes; increase curb radii
	Large Volume of Through Traffic	Move driveway to side street; construct a local service road
	Large Volume of Driveway Traffic	Signalize driveway; provide acceleration and deceleration lanes; channelize driveway
	Restricted Sight	Remove obstructions
	Inadequate Lighting	Improve street lighting
Nighttime	Poor Visibility or Lighting	Install/improve streetlighting; install/improve delineation/markings; install/improve warning signs
	Poor Sign Quality	Upgrade signing; provide illuminated reflectorized signs
	Inadequate Channelization or Delineation	Install pavement markings; improve channelization/delineation

ACCIDENT ANALYSIS

Figure 55-8E (Continued)

Accident Pattern	Probable Cause	Safety Enhancement
Pedestrian/ Bicycle	Limited Sight Distance	Remove sight obstructions; install/ improve pedestrian crossing signs and markings
	Inadequate Protection	Add pedestrian refuge islands
	Inadequate Signals/Signs	Install/upgrade signals/signs
	Mid-block Crossings	Install warning signs/markings
	Inadequate Pavement Markings	Supplement markings with signing; upgrade pavement markings
	Lack of Crossing Opportunity	Install traffic/pedestrian signals; install pedestrian crosswalk and signs
	Inadequate Lighting	Improve lighting
	Excessive Vehicle Speed	Install proper warning signs
	Pedestrian/Bicycles on Roadway	Install sidewalks; install bike lanes/path; eliminate roadside obstructions; install curb ramps
	Long Distance to Nearest Crosswalk	Install pedestrian crosswalk; install pedestrian actuated signals
Wet Pavement	Slippery Pavement	Improve skid resistance; groove existing pavement
	Inadequate Drainage	Provide adequate drainage
	Inadequate Pavement Markings	Install raised/reflectorized pavement markings

ACCIDENT ANALYSIS

Figure 55-8E (Continued)

Accident Pattern	Probable Cause	Safety Enhancement
Railroad Crossings	Restricted Sight Distance	Remove sight obstructions; reduce grade; install active warning devices; install advance warning signs
	Poor Visibility	Improve roadway lighting; increase size of signs
	Inadequate Pavement Markings	Install advance markings to supplement signs; install stop bars; install/improve pavement markings
	Rough Crossing Surface	Improve crossing surface
	Sharp Crossing Angle	Rebuild crossing with proper angle

ACCIDENT ANALYSIS

Figure 55-8E (Continued)